

Appl. No. 09/759,962
Amdt. Dated November 21, 2005
Reply to Office action of May 19, 2005

Amendment to the claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims:

1. (canceled)
2. (currently amended) The method according to claim 2, further comprising determining a static load pushover profile for use in a static load pushover analysis.
3. (currently amended) The method according to claim 2 wherein the step of automatically determining non-linear input data includes automatically determining the envelope behavior, degradation behavior, and failure behavior of members of the structure based on previously determined models of the members and the received linear elastic input data.
4. (Original) The method according to claim 3 wherein at least a part of the data for the previously determined models is based on experimental or empirical data, and each model is stored as a plurality of data points, a mathematical representation, or both.
5. (canceled)
6. (canceled)
7. (canceled)
8. (canceled)
9. (currently amended) A computer-implemented method for analyzing a structure comprising:
receiving linear elastic input data of a structure;

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automatically determining non-linear input data based on the received linear elastic input data;

analyzing the determined non-linear input data through a non-linear analysis technique; and

outputting the result of analysis including at least global damage measure including one or more of a global displacement ductility and number of damaged members, regional damage measure including one or more of inter-story drifts, inter-story shears, number of damaged members in a region, and identification of damaged members; and local damage measure including one or more of maximum member ductilities, cumulative member ductilities and number of cycle reversals.

~~The method according to claim 1~~ wherein the step of analyzing includes at least two or more of:

using a minimization technique to minimize the storage requirements of a global stiffness matrix and local stiffness matrix;

using a numerical solution technique that requires only one copy of the global stiffness matrix;

reformulating and reducing only a portion of a global stiffness matrix that changes due to change in member state; and

using a sufficiently higher order integration method to increase the step size thereby reducing the number of steps required for analysis.

10. (currently amended) The method according to claim 9, further comprising displaying a summary of inelastic sequence of events for damaged members of the structure.

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11. (Original) The method according to claim 10 wherein the summary includes global, regional, and local damage measures.

12. (canceled)

13. (currently amended) The method according to claim 9 + wherein the step of outputting includes outputting a color-coded image of the structure showing different levels of damage to the members of the structure.

14. (currently amended) The method according to claim 9 +, further comprising:

repeating the analyzing step for each of a plurality of intensities or probabilities of a preselected catastrophic load; and

displaying the number of damage measures as a function of the intensities or probabilities of the preselected catastrophic load.

15. (Original) The method according to claim 14, further comprising using the damage measures to assess monetary losses or to make a financial or mitigation decision.

16. (currently amended) A computer-implemented method for analyzing a structure comprising:

classifying a plurality of structures according to predetermined structure types ~~without requiring physical presence of the plurality of structures;~~

sub-classifying the structures within each classified structure type by fundamental structure periods;

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determining damage functions for the sub-classified structures; and
storing the determined damage functions.

17. (Original) The method according to claim 16, further comprising
determining non-structural damage functions corresponding to the structural damage
functions.

18. (Original) The method according to claim 16 wherein the step of
classifying includes classifying the plurality of structures according to either FEMA
guidelines or building code guidelines.

19. (Original) The method according to claim 16 wherein the step of sub-
classifying includes sub-classifying as similar structures all structures within a classified
structure type whose fundamental structure period falls within a predetermined range.

20. (Original) The method according to claim 16, further comprising:
receiving location and other data of a first structure;
identifying among the plurality of classified structures one classified structure that
corresponds to the first structure; and
retrieving the stored damage function of a sub-classified structure that
corresponds to the identified structure for analysis of the first structure.

21. (Original) The method according to claim 16, further comprising:
determining a fault that likely causes damage to the first structure;
determining at least one spectral acceleration of the determined fault line to the
structure; and
determining a damage measure for the determined spectral acceleration from the
retrieved damage function.

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22. (Original) The method according to claim 16 wherein the step of determining damage functions includes:
determining damage functions of a plurality of previous disasters; and
calculating a mean damage function from the determined damage functions by regression.

23. (Canceled)